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08 FEB 1996

Commonwealth of Virginia
Department of Environmental Quality
Waste Division
Attn: Mr. Dinesh Vithani
629 East Main Street
Richmond, Virginia 23219

Re: Responses to Comments on the Draft Final Remedial Investigation Report on the CD Landfill, Norfolk Naval Base, Norfolk Virginia

Dear Mr. Vithani:

We have received the Virginia Department of Environmental Quality's (VDEQ) letters of September 1, 1995 and September 7, 1995 containing comments on the Draft Final Remedial Investigation. Enclosed are responses to VDEQ's comments. The Final RI, which incorporated these responses, and the Draft Final Feasibility Study were forwarded to you on December 22, 1996.

The Proposed Remedial Action Plan (PLAN) is scheduled for distribution to the Naval Base, Norfolk Restoration Advisory Board on March 15, 1996.

If you have any questions, please contact the Remedial Project Manager, Mr. Dave Forsythe, at (804) 322-4783.

Sincerely,

N. M. Johnson

N. M. JOHNSON, P.E.
Head, Installation Restoration Section, (North)
Environmental Programs Branch
Environmental Quality Division
By direction of the Commander

Enclosures

Copy to:
EPA Region III (Mr. Robert Thomson, 3HW71)
Administrative Record File (Naval Base Norfolk)
COMNAVBASE Norfolk (Ms. D. Bailey, N42B)
Baker Environmental (Mr. Gordan Ruggaber/Ms. Jeri Trageser)
Admin Record File

ATTACHMENT A

RESPONSE TO VDEQ COMMENTS
DRAFT FINAL REMEDIAL INVESTIGATION REPORT
CD LANDFILL SITE, NAVAL BASE, NORFOLK, VIRGINIA

Dinesh Vithani Comments (8/21/95)

1. Page 3-4, Section 3.1.3: The second paragraph states that Investigation Derived Waste (IDW) was containerized in a lined roll-off box and temporarily stored on site prior to transport and final disposal. Please note that DEQ has its own IDW handling guidelines which should be incorporated. A copy of DEQ IDW guidelines is enclosed for your review.

Response: Based on review of the analytical results with LANTDIV and the VDEQ, IDW was determined to be hazardous or non-hazardous waste. According to the Final Bulking, Sampling, and Disposal Report (Baker, November 1994), all soils generated at the CD Landfill Site were accepted as non-hazardous waste at the First Piedmont Corporation Landfill in Ringgold, Virginia. Decontamination liquids and development/purge waters generated during the RI were disposed at the Laidlaw Environmental Services facility in Nashville, Tennessee.

2. Page 5-19, Section 5.2.3.2: The last sentence of first paragraph states that only benzo(a)pyrene in sample SB-09S was detected at a level above the associated residential RBC value. However, the last sentence of the second paragraph states that neither surface nor subsurface soil samples analyzed for SVOCs exceeded associated RBC values. Please clarify this apparent discrepancy.

Response: Text has been amended to read, "However, no Round 1 subsurface soil samples analyzed for semi-volatile organics exceeded associated RBC values."

3. Tables 5-17 to 5-27: These tables used residential RBC values for comparison with sample concentrations. Since this base is not under BRAC, residential use of the site is not expected in near future.

Response: Residential RBC values were used for comparison as a conservative measure.

4. Table 5-45: The values for Radium 226 and Radium 228 for sample GW208A do not exceed the published standards, but are shown in bold.

Response: These values were bolded because when totaled, they exceed the total Radium criteria level of 5 pCi/L. The table has been footnoted to more clearly identify the reason for bolding these values.

5. Page 6-23 and 6-31: The first paragraph of page 6-31 states that Radium and Radon 222 exceed federal criteria. Since radionuclides are naturally occurring (3rd paragraph page 6-23), the migration of radionuclides to groundwater from the soil is a continuous process. Unless this migration is stopped, remediation of groundwater may not be permanent.

Response: Because radionuclides in soil or groundwater are not considered contaminants of concern (based on natural occurrence), remediation of groundwater for these constituents will not be required.

6. Tables 5-36 and Table 6-5: Table 6-5 shows comparison of groundwater results for only four parameters. Table 5-36 shows that there are several inorganic parameters detected in groundwater.

Response: Table 6.5 compares RI results with results of previous investigations where analyses of cadmium, iron, lead and sodium were similar to each study.

7. Page 7-4, Section 7.1.2: The last two sentences of the first paragraph state that radionuclides will not be evaluated since consensus is reached among all interested parties. However, according to comment #5 above, Radium and Radon 222 both exceed the federal criteria in groundwater. Therefore, evaluation of risk to human health should be considered.

Response: An evaluation of analytical data was conducted to determine the source of radiological constituents in soil and groundwater at the site. Mr. William Belanger (USEPA health physicist), Mr. Grant Wilton (Quanterra Laboratory, radiochemist), and Lt. Commander Lino Fragoso (Radiological Affairs Support Office, Yorktown) joined Baker in the evaluation. Because total Radium in groundwater only slightly exceeds the federal criteria of 5 pCi/L in one well (MW-08A - 6.02 pCi/L) and based on a comparison of selected isotopic ratios, all parties agreed that radium in groundwater is naturally occurring and is not a constituent of concern at this site.

Radon 222 was present at greater than twice the federal groundwater criterion of 300 pCi/L in well MW-04B (672 pCi/L). However, since all other samples, including the sample obtained from an adjacent well (MW-04A) were below the federal criterion and considered naturally occurring; and because MW-04A and MW-04B screen a similar portion of the water table aquifer, the analytical result was considered suspect and not cause for concern. Therefore, according to RAGS, naturally occurring radionuclides do not require a human health risk evaluation.

Risk assessment text will be expanded to reference those earlier report sections which provide the evaluation of radionuclide results.

8. Page 7-9, Section 7.2.2: The first paragraph in this section states that during the selection of COPCs, essential inorganic nutrients were excluded for consideration. Please note that high concentration of these nutrients may be harmful to human health and the environment.

Response: The comment regarding "high" concentrations of essential inorganic nutrients possibly being harmful to human health and the environment is noted and will be added to the cited text. However, due to the general unavailability of established standards and/or criteria to which environmental concentrations of these inorganics can be compared, the determination of what constitutes a "high" concentration for any given constituent (i.e., the concentration level at which adverse effect(s) to human and/or environmental receptors may be observed subsequent to exposure(s)) might prove to be difficult and somewhat subjective.

9. Page 7-16: Nickel was omitted in the list of constituents identified in shallow sediments.

Response: Nickel has been included in the list of shallow sediment COPCs retained for risk assessment evaluation.

10. Page 7-35: Last paragraph states that exposures to noncarcinogens were estimated using the concept of an average annual exposure. However, AT_{nc} in Table 7-12 uses 1460 days as exposure time which is the product of ED (4 years in this case) x 365 days. Please clarify this discrepancy.

Response: The sentence wording will be modified to reflect that exposures to noncarcinogens are averaged over the duration of exposure.

11. Page 7-62: Sentence at top of this page specifies a default PEF value of 4.63 x 10^9 which appears to be an error.

Response: The default PEF value of 6.79 x 10^8 m^3/kg, which was obtained from USEPA Region III, Risk-Based Concentration Table, January - June 1995, will be used in the calculation of air concentrations of fugitive dusts.

12. Table 7-11: Inhalation of fugitive dusts emanating from on-site surface soils was not a selected pathway for evaluation for both current trespasser children and adults. Why?

Response: Site surface soils are covered with a grass cap to minimize erosion and dust generation. In addition, direct exposure to site surface soils by child and adult trespassers has been limited by the fence which has been installed along both sides of Seabee Road.

13. Table 7-15: Only two media were considered in this scenario. However, it is possible for construction workers to get exposure from subsurface soils, surface water and sediment.

Response: In the Draft Final RA, future construction workers were evaluated for exposures to COPCs in surface and subsurface soils. Ingestion and dermal exposures to surface water and sediment will be added to the evaluation of potential risks to the construction worker.

14. Table 8-1: Subsurface soil was not included in this table.

Response: Contaminants in the subsurface soil were not evaluated in this ERA. Current guidance does not provide sufficient information to evaluate risk to subsurface receptors. Therefore, Table 8-1 does not include subsurface soils.

15. Table 8-2: Number of positive detects above lowest surface water screening level (SWSL) for aluminum should be 7 instead of 6 as specified.

Response: Table 8-2 has been amended.

16. Table 8-2: Number of positive detects above lowest SWSL for iron should be 7 instead of 6 as specified.

Response: Table 8-2 has been amended.

17. Table 9-1: SVOC and Pesticide/PCBs are missing as listed contaminants from deep sediment. Also, SVOCs are missing as listed contaminants from subsurface soils.

Response: Table 9-1 has been amended to include: SVOCs in deep sediment in the eastern drainage area; pesticides/PCBs in deep sediments in the northern and southern drainage areas; and, SVOCs (primarily benzo[a]pyrene) in subsurface soil in borings SB-17 and SB18.

Patricia McMurray Comments (9/1/95)

1. Page 2-7, Section 2.6.4: This section states that site-related contaminants have not impacted the shallow groundwater in the Glenwood Park area. It should be noted, however, that the Glenwood Park wells were analyzed only for contaminants related to Camp Allen (organics). Since the wells were not analyzed for metals, it should not be implied that contaminants potentially associated with CD Landfill have been investigated in the residential wells.

Response: The last sentence of the second paragraph has been amended to read, "However, because of the location (upgradient) and distance to the Glenwood Park area, residential wells were not sampled during the CD Landfill investigation.

2. Page 3-6, Section 3.1.4: This section explains the designations of wells as A, B, or C. What do the sample numbers that do not have one of these designations refer to? (e.g., CDLGW101, CDLGW102, CDLGW107 in Appendix O-5). Also, this section indicates that there was one well designated "B'", but Appendix O-5 shows 5 samples with "B" designations. This apparent discrepancy should be clarified.

Response: To assist in the data evaluation process, the A, B, or C designation was added to sample numbers to refer to general depth of a well. Some sample numbers in Appendix O-5 may be missing this designation; however, all groundwater sample numbers referenced in Tables 5-29 to 5-45 in Section 5.0 include the appropriate letter designation.

The section refers to monitoring wells installed during Round 1 of the current investigation, where only one well was installed to the base of the water table aquifer (MW-03B - 62 feet below ground surface at this location). Appendix O-5 shows 5 samples with "B" identifiers, because a "B" was added to existing wells to designate that these were screened below the soil/water interface, at a depth of 25 feet below ground surface.

3. Page 6-23, Section 6.5.2.3: Please cite the reference for the test based on radionuclide ratios. From the description of this test it was not clear why secular equilibrium would not also be exhibited by anthropogenic sources of radionuclides.

Response: Although secular equilibrium is a widely known criterion for natural occurrence of radionuclides, none of the references used in this evaluation state it clearly as a "formula". Therefore, conclusions regarding the source of radionuclides (natural occurrence) in soil and groundwater at the CD Landfill site were supported by Mr. William Belanger (health physicist, Region III USEPA), Mr. Grant Wilton (radiochemist, Quanterra Laboratory), and Lt. Cmdr. Lino Fragoso (Radiological Affairs Support Office [RASO], Yorktown), who all agreed that the relationship between selected radionuclide concentrations detected during this investigation point to natural occurrence.

4. 7-4, Section 7.1.2: This section states that radionuclides will not be evaluated in the baseline risk assessment. Radionuclides should be screened for inclusion as COPCs. Those that exceed the screen should be carried through the risk assessment. (Note that in a conference call on October 5, 1994 it was indicated that radionuclides would be included in the risk assessment.)

Response: Sections 5.0 and 6.0 of the RI present data results and an evaluation of radionuclides in soils and groundwater, respectively. Based on secular equilibrium, concentrations detected at the site have been determined as naturally occurring. The risk assessment text will be amended to more clearly state this fact.

5. 7-20, Section 7.3: This section discusses how exposure point concentrations were determined for groundwater. It was not clear from this discussion which sampling rounds were considered. From Appendix W, it appears that only rounds two and three were considered. A rationale should be provided for this. It appears that some of the higher contaminant concentrations may have been eliminated by eliminating round one.

Response: Analytical data from rounds two and three were used to select groundwater COPCs and derive exposure point concentrations. Data from round one were not used since the round one wells were resampled in the later rounds, and since the most recent rounds more closely approximate current groundwater conditions. However, for the Final Baseline RA, all three rounds of groundwater data will be used for selecting COPCs and deriving exposure point concentrations.

6. Page 7-30, Section 7.3.3.3: This section states that the on-site groundwater is not potable. Please describe the evaluation that was done to make this determination or refer to the section of the report that addresses this.

Response: The Columbia (water table) Aquifer in the vicinity of the site is not suitable for potable use because of high concentrations of iron, manganese, and total dissolved solids, as well as low pH (less than 6). Public water within a 4-mile radius is supplied by the City of Norfolk Department of Utilities and the City of Portsmouth Department of Public Utilities (see Section 2-6).

7. Page 7-31, Section 7.3.3.4: The list of potential human receptors should also include potential future civilian workers. A civilian employee would be assumed to have a 25 year exposure duration.

Response: A maintenance worker will be evaluated for exposures to surface soils via the pathways of ingestion, dermal contact and inhalation of fugitive dusts. An exposure frequency of 26 days per year (corresponding to one day per week for 26 weeks, or six months, out of the year) will be used for this receptor.

8. Page 7-47, Section 7.3.4.3.3: The last paragraph on this page refers to adult trespassers, while the rest of the section addresses adult residents. This apparent typographical error should be corrected.

Response: This is a typographical error and will be corrected for the Final report.

9. Page 7-51, Section 7.4.2: Oral toxicity factors that have been based on administered dose should be adjusted for absorption when applied to dermal exposure. The method of adjustment should be discussed in this section.

Response: This will be done; however, it may be necessary for the Agency to provide some gastrointestinal absorption efficiencies in order to perform the adjustments in a manner that will be agreeable to parties involved.

10. Page 7-53, Section 7.4.3: Aluminum is included as a chemical that was not quantitatively evaluated because it does not have an EPA toxicity factor. However, aluminum has been quantitatively evaluated in soils. Thallium has also been quantitatively evaluated using a surrogate RfD. It is also not reasonable to assume that arsenic as a COPC sufficiently addresses the toxicological effects of excluded metals, since they have difference targets. This section should be revised accordingly.

Response: The cited paragraph will be modified to focus only on lead.

11. Page 7-54, Section 7.5: This section refers to Di as the dose for radionuclides. However, radionuclides had previously been eliminated from consideration in the risk assessment. Please clarify this issue.

Response: The sentence: "For radionuclides, Di is the dose." will be deleted from text.

12. Page 7-61, Section 7.6.3: The section on sources of uncertainty should also include a discussion of the use of the adjusted dermal permeability coefficient. As noted in the Dermal Exposure Assessment: Principles and Applications the model is still being reviewed by the scientific community and there are concerns that the model may be overly conservative. This is particularly important for the shallow groundwater, where dermal exposure contributes the majority of the carcinogenic risk.

Response: A discussion of the use of the adjusted dermal permeability coefficient will be added to the uncertainty section.

13. Page 7-62, Section 7.6.3: This section states that exclusion of the five COPCs from quantitative evaluation only impacts the results insignificantly. This may be true numerically. However, the chemical class of the COPC is also important in making risk management decisions. Therefore, it is important that all COPCs be assessed. For example, if chlorobenzene had been assessed, it would have contributed to the hazard index exceeding one in shallow groundwater. Since volatile organic compounds (VOCs) were screened out of the well that was assessed, the results appear to indicate that VOCs do not significantly contribute to the risk. This is misleading. Since a plume was apparently not identified, it may be more appropriate to evaluate several of the wells quantitatively in order to present a more complete risk characterization.

Response: In order to prevent the screening of COPCs from quantitative evaluation, the groundwater data from all three rounds of sampling will be used to derive 95%UCL exposure point concentrations, which will in turn be used in the risk calculations, rather than data from individual monitoring well locations.

14. Table 7-4: It is not clear why chloroform has not been included as a positive detect and a COPC on this table since it was detected in samples CDLGW103A and CDLGW104A above the RBC. Also, chlorobenzene is shown to be detected in 2 of 14 samples at a maximum concentration of 1,000 ug/L. However, chlorobenzene was detected in CDLGW105A at a concentration of 2000 ug/L (1900 ug/L in the duplicate). These and other apparent discrepancies on this table should be clarified.

Response: The groundwater samples cited in the comment were collected during round one. Round one groundwater samples were not used in the Draft Final Baseline RA, but will be used in the Final RA (see Response to Comment No. 5).

15. Table 7-16: This table cites the oral RfD for manganese of 5.0 x E-3, which is the RfD based on ingestion of water. As noted in the toxicological profile, there is also an RfD available for manganese in food. This RfD may be more applicable to ingestion of manganese from soil.

Response: The RfD for manganese in food will be used for the evaluation of soil and sediment ingestion.

16. Appendix T, Table T-26: It is not clear how the air concentration of these two contaminants was derived since they were not detected in the groundwater sample from GW-04. This apparent discrepancy should be explained.

Response: Chlorobenzene and 1,4-dichlorobenzene were not detected in the groundwater sample collected from location GW-04. The inhalation of groundwater contaminants in shower air will be re-evaluated.

Mark Richards Comments (9/19/95)

General Comment:

1. The ecological risk assessment (ERA) essentially follows the screening level guidelines contained in the EPA Region III's interim Ecological Risk Assessment guidance. Based on the interpretation of the Quotient Index (QI), which is equivalent to the Environmental Effects Quotient (EEQ) in EPA's guidance document, there is moderate to extreme risk to all potential on-site receptors (and off-site receptors).

Response: Comment noted.

2. Transport of contaminants off-site is not known based on the available data.

Response: Surface water and sediments were sampled downstream towards the Bousch Creek culvert, which includes off-site areas of potential impact. This will be expanded in the ERA. In addition, other influences on the downstream and upstream areas relative to Bousch Creek, such as the Naval Air Station, Camp Allen Landfill, and the overall effects of the tide, will be noted.

3. The information obtained through this study suggests the potential for bioaccumulation exists based on the detection of chlorinated pesticides and PCBs.

Response: Comment noted.

4. This study does not establish the source of the chlorinated pesticides (i.e., whether pesticides were disposed in the landfill or are residuals from past applications).

Response: The potential source of the pesticides will be discussed in the ERA, including a discussion of the routine spraying of pesticides that likely occurred. There is no evidence that pesticides were disposed in the landfill. Most likely, pesticides were applied during landfill operations to minimize pests; then, as each area was filled, the ground surface was covered and became part of the subsurface.

Historically, PCB-containing oils were routinely sprayed on unpaved roadways to minimize dust, and could very likely have been sprayed on landfill access roads during site operations.

Specific Comments:

1. Section 8.3.1.3 Toxicity - For those organic compounds where toxicological literature is not available for these media, it may have been possible to determine the toxicity based on Structural Activity Relationship (SAR) of similar compounds where information does exist. For compounds such as Beta-BHC, available toxicity information from its isomers could have been used. There is concern regarding exclusion of Beta-BHC, Endrin Aldehyde, and Heptachlor Epoxide.

Response: The three compounds did not have a high frequency of detection and would be eliminated based on this. This will be more fully explained in the text.

2. Section 8.3.1.4 - Virginia Water Quality Standards (surface water) - The first sentence should read "WQS... that will not result in acute and chronic toxicity to aquatic life." Please add "acute"

Response: Text will be amended.

3. Section 8.3.1.5 Field and Laboratory Blank Data - The third sentence where "greater" is used (two places), should be replaced with "less" in both places.

Response: Text will be corrected.

4. Section 8.3.2.3 Surface Soils (4th paragraph) - 4,4'-DDT should be retained as a COPC. The information on Table 8-6 indicates that one (or more) data points exceed(s) the SSSL for 4'4-DDT, not 4'4-DDE, as indicated on the table. The text in this section and in section 8.8.3 should be corrected. Also Tables 8-6 and 8-7 should be corrected.

Response: The text and tables will be corrected.

5. Section 8.9 Risk Characterization - The 95% Upper Confidence Level (UCL) was not used in the calculation of the QIs even though EPA Region III suggests using this statistic.

Response: The UCL will be used in conjunction with the current method of evaluation of each station. The latter method gives a better indication of whether the problem is localized or wide-spread and the presence of trends in the station area.

6. Section 8.11 Uncertainty Analysis - Exclusion of the 95% UCL in the denominator of the QI calculation adds uncertainty to this ERA since the use of maximum values increases the conservatism of the study. Some discussion regarding this uncertainty should be included.

Response: The UCL will be used: and, therefore, additive effects will be considered.

7. Section 8.12.1 Aquatic Ecosystems - Many of the high QI values generated from the available surface water and sediment data do not support the conclusions presented in this section. The QIs derived using the chronic SWSL suggest the contaminants will cause adverse risk to the population. Furthermore, the QIs derived from the sediment ER-L show there is potential for adverse risk at all stations.

Response: The text states that risks are present at the site and the stations with localized impacts are indicated. To further expand on the fact that there are potentially significant risk to the exposed receptors at the site, the signficance and conclusions of this screening level ecological risk assessment will be revised. In addition, a discussion of the drainage area habitat will be provided.